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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,516	03/19/2004	Arun Kwangil Iyengar	YOR920040025US1	7509

7590 03/04/2008
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EXAMINER	
PHUNG, LUAT	

ART UNIT	PAPER NUMBER
2616	

MAIL DATE	DELIVERY MODE
03/04/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/804,516	Applicant(s) IYENGAR ET AL.	
	Examiner LUAT PHUNG	Art Unit 2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/ are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's arguments filed on December 21, 2007 have been fully considered but they are not deemed to be persuasive. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn. The rejections and/or objections in this office action are either reiterated or newly applied. They constitute the complete set presently being applied to the instant application.

2. On page 8, Applicant argues that:

In characterizing the Colby reference as disclosing a quality-of-service (QoS) class assigned to a client from which the request originated, the Examiner refers to column 2, lines 58-61 of Colby. The only reference to QoS is that the QoS requirements are implied by the content request. In fact, no where does Colby disclose assigning a QoS class to a client. Accordingly, it is believed that the teachings of Colby fail to meet the limitations of claim 1.

Examiner respectfully disagrees because:

As noted in the rejection of claim 1, and acknowledged by Applicant, QoS requirements are implied by the content request, which is initiated by a client. (col. 2, lines 55-61) Specifically Colby discloses: "a client ... makes a content request, the request is intercepted by a content-aware flow switch, which seamlessly forwards the content request to a server that is well-suited to serve the content request [interpreted as scheduling the request to a server]. The server is chosen ... based on the QoS requirements implied by the content request [made by the client]." Thus limitation

"scheduling submission of the request to the at least one server based on: (i) QoS class assigned to a client from which the request originated" of claim 1 reads on the aforementioned quote by Colby.

Furthermore, Colby describes the switch querying known capabilities of clients [interpreted as QoS class assigned to a client] (col. 7, lines 19-20) to make a determination of which available servers can service the request originated by the client (col. 10, lines 37-38). Again, claim 1 reads on the prior art from Colby.

Additionally, Colby describes assigning a QoS class to a flow based on QoS requirements implied by the request, and that a flow is initiated by a request at a client. (col. 9, lines 36-37; col. 2, lines 5-10 and lines 60-61). This QoS class is further used by the flow switch to determine the server to service the request. Thus it is inherent that the QoS class is assigned to a client for the instant connection, and is used to schedule the request to a server.

3. On page 9, Applicant argues that:

The Colby reference does not disclose assigning at least one client to a quality-of-service (QoS) class from among at least two QoS classes, as noted above with regard to claim 1. Bender fails to supplement the above-noted deficiencies. Accordingly, it is believed that the teachings of Colby and Bender fail to meet the limitations of claim 18.

Examiner respectfully disagrees because:

As noted in the office action, claim 18 is a substantial duplicated of claim 1 and 2, and the limitation "assigning at least one client to a QoS class from among at least two

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QoS classes" is read on by Colby as explained above, and as stated in the rejection of claim 1.

4. On page 10, Applicant argues that:

With regard to claims 2-4, no where does Colby teach or suggest withholding the request from submission to the at least one server when the request originated from a client assigned to a first QoS class to allow a request that originated from a client assigned to a second QoS class to meet a response target associated therewith (as recited in claim 2), determining a throughput of the at least one server; and reducing a request withhold rate to increase throughput of the at least one server (as recited in claim 3), and monitoring a throughput of the at least one server; and varying a request withhold rate to balance the throughput and request response times (as recited in claim 4).

Examiner respectfully disagrees because:

Claims 2-4 are rejected under 35 USC § 103 as being unpatentable over Colby *and Bender*, as recited in the rejection of claims 2-4 in this office action.

5. On page 10, Applicant argues that:

Regarding the claims 8 and 10-12 which depend from independent claim 1, Applicants assert that such claims are patentable not only due to their respective dependence on claim 1, but also because such claims recite patentable subject matter in their own right. Also, Veres and Menditto fail to remedy the above-described deficiencies of Colby.

Examiner respectfully disagrees because:

Claims 8 and 10-12 are rejected under U.S.C. 103(a) as being unpatentable over Colby in view of Veres and Menditto, as recited in the rejection of claims 8 and 10-12 in this office action.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 5-7 and 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Colby, et al (US 6,449,647).

Regarding claim 1, Colby discloses a method of processing a request to at least one server, comprising the steps of:

receiving a request (col. 2, lines 55-56); and
scheduling submission of the request to the at least one server (col. 2, lines 58-59) based on: (i) a quality-of-service (QoS) class assigned to a client from which the request originated (col. 2, line 54 to col. 3, line 9; col. 7; col. 9, line 25 to col. 10, line 59); (ii) a response target associated with the QoS class (col. 9, lines 25-32; col. 21, lines 50-51); and (iii) an estimated response time associated with the at least one server (col. 22, lines 10-11).

Regarding claim 5, Colby further discloses further comprising the step of assigning the response target to the QoS class (Table 1; col. 9, lines 25-39; col. 22, lines 10-11).

Regarding claim 6, Colby further discloses wherein the step of assigning the response target to the QoS class further comprises the step of assigning a response time target to the QoS class. (Table 1; col. 9, lines 25-39; col. 22, lines 10-11)

Regarding claim 7, Colby further discloses wherein the step of assigning the response target to the QoS class further comprises the step of assigning a response percentile target to the QoS class. (col. 16, lines 56-61 and 65-66).

Regarding claim 14, Colby further discloses an apparatus for processing a request to at least one server, comprising:

a memory (RAM per Fig. 23, element 110); and

at least one processor coupled to the memory (Fig. 23, element 1080) and operative to perform the method of claim 1, and is therefore rejected under the same reason set forth in the rejection of claim 1.

Regarding claim 15, Colby further discloses the apparatus of claim 14, wherein the memory and the at least one processor form a scheduler (Fig. 1b, element 110) that is external to the at least one server (Fig. 1b, elements 100).

Regarding claim 16, Colby further discloses the apparatus of claim 15, wherein the scheduler is a front-end scheduler and the at least one server is a back-end server (Fig. 1b, elements 110 and 100; col. 16, lines 28-29).

Claim 17 is an apparatus claim corresponding to method claim 1 and is therefore rejected under the same reason set forth in the rejection of claim 1.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 2-4, 18-20 and 25 are rejected under U.S.C. 103(a) as being unpatentable over Colby, et al in view of Bender, et al (US 6,112,221).

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Regarding claims 2-4, Colby discloses all of the subject matter as disclosed previously in this office action except for the following:

further comprising the step of withholding the request from submission to the at least one server when the request originated from a client assigned to a first QoS class to allow a request that originated from a client assigned to a second QoS class to meet a response target associated therewith, as recited in claim 2;

determining a throughput of the at least one server; and

reducing a request withhold rate to increase throughput of the at least one server, as recited in claim 3;

monitoring a throughput of the at least one server; and

varying a request withhold rate to balance the throughput and request response times, as recited in claim 4.

Bender from the same or similar fields of endeavor discloses a server which employs a pre-emptive setting not continuously processing a request, but scheduling them according to an earliest deadline first methodology, by alternately processing the request with the earliest deadline first, followed by that with the next earliest deadline, and so on (col. 4, lines 52-58; col. 5, lines 27-35), calculating processing time and dead line for each request (Fig. 2, element 102), and continue adjusting estimated processing time (Fig. 2, element 112).

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to combine the request processing method of Colby with the pre-emptive scheduling method of Bender by pre-empting the request having a lower QoS

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class with the request having a higher QoS class, monitoring the throughput of the servers, and adjusting the pre-emption rate so that the request can be processed within the target response time. The motivation for using pre-emptive procedure would have been to prioritize requests according to response target.

Claim 18 is a substantial duplicate of claims 1 and 2 combined and is therefore rejected under the same reason set forth in the rejection of claims 1 and 2.

Claims 19 and 20 are substantial duplicates of claims 3 and 4, respectively, and are therefore rejected under the same reason set forth in the rejection of claims 3 and 4, respectively.

Claim 25 is a substantial duplicate of claims 1 and 2 combined and is therefore rejected under the same reason set forth in the rejection of claims 1 and 2.

12. Claims 8 and 10-12 are rejected under U.S.C. 103(a) as being unpatentable over Colby, et al in view of Veres, et al (US 6,807,156) and Menditto et al (6,981,029).

Regarding claims 8 and 10-12, Colby discloses all of the subject matter as disclosed previously in this office action except for the following:

further comprising the step of estimating the response time associated with the at least one server based on one or more requests sent to the at least one server within a given time period, as recited in claim 8;

determining dispatch times for requests from a difference between at least one predicted response time of the at least one server and the target response time corresponding to the QoS class of the request; and

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sending requests to the at least one server based on dispatch times, as recited in claim 10;

wherein a plurality of applications are running on the at least one server and requests are routed to applications, further comprising the steps of:

estimating response times of applications based on one or more requests sent to the applications within a time period; and

sending a request to an application whose estimated response time is not greater than a target response time corresponding to the QoS class of the request, as recited in claim 11;

further comprising the step of varying a number of requests sent to applications so that estimated response times of applications are not greater than target response times of QoS classes corresponding to requests sent to the applications, as recited in claim 12.

Veres from the same or similar fields of endeavor discloses further comprising the step of estimating the response time (col. 13, lines 46-47) associated with the at least one server or applications based on one or more requests sent to the at least one server or applications within a given time period (time window of measurement as shown in Fig. 2; col. 13, lines 36-47).

Menditto from the same or similar fields of endeavor discloses a content gateway selecting a server that can deliver with an acceptable response time (col. 2, lines 64-66). Examiner takes official notice that it is well known in the art that having an

acceptable response time means the actual time it takes an application or server to process a request is less than the expected time to process a request.

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to combine the request processing method of Colby with the response time estimating method of Veres and the QoS enforcement approach by Menditto by periodically sending requests to the applications and servers to estimate the response time, and selecting a server that can timely process the request. The motivation for such a combination would have been to ensure service level agreement based on response time is met.

13. Claim 9 is rejected under U.S.C. 103(a) as being unpatentable over Colby, et al.

Regarding claim 9, Colby discloses all of the subject matter as disclosed previously in this office action except further comprising the step of assigning a target response time to a plurality of QoS classes in which lower quality classes are assigned larger response times than higher quality classes.

However Colby discloses QoS classes based on delay, whereas lower quality class is assigned higher delay (QoS class 3 with delay of 500 ms per Table 1) than higher quality class (QoS class 1 with delay of <250 ms per Table 1). Examiner takes official notice that it is well known in the art that delay is proportional to response time in terms of processing a request by a server.

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the request processing method with the QoS assignment based on response time by assigning larger response times to lower quality

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QoS classes of requests. The motivation for such implementation would have been to ensure service level agreement based on response time is met.

14. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Colby, et al in view of Veres, et al and Menditto, et al, and further in view of Lu, et al (US 6,772,211).

Regarding claim 13, Colby, Veres and Menditto disclose all of the subject matter as disclosed previously in this office action except wherein the at least one server comprises a plurality of servers and each application runs on a different one of the plurality of servers.

Lu from the same or similar fields of endeavor discloses methods to switch client packets to one server among a group of servers (col. 4, lines 50-53) and applications have their own dedicated servers (col. 5, lines 24-26).

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to combine the packet processing method of Colby, Veres and Menditto with the servers and applications of Lu by implementing the method and each application on a separate server. The motivation for such a combination would have been to modularize the features for scalability and performance.

15. Claims 21-23 are rejected under U.S.C. 103(a) as being unpatentable over Colby, et al and Bender, et al in further view of Veres, et al and Menditto et al.

Claims 21-23 are substantial duplicates of claims 10-12, respectively, and are therefore rejected under the same reason set forth in the rejection of claims 10-12, respectively.

16. Claim 24 is rejected under U.S.C. 103(a) as being unpatentable over Colby, et al, Bender, et al, Veres, et al and Menditto et al in further view of Lu, et al.

Claim 24 is a substantial duplicate of claims 13 and is therefore rejected under the same reason set forth in the rejection of claim 13.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure (see form 892).

18. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

19. Examiner's Note: Examiner has cited particular paragraphs, columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing

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responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner. In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and, also to verify and ascertain the metes and bounds of the Claimed invention.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luat Phung whose telephone number is 571-270-3126. The examiner can normally be reached on M-Th 7:30 AM - 5:00 PM, F 7:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Firmin Backer can be reached on 571-272-6703. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/L. P./

Examiner, Art Unit 2616

 2/27/08

**BRIAN NGUYEN
PRIMARY EXAMINER**